



peer review Peer review

leukotomy BRAIN Initiative

## Technological Singularity AlphaGo

Nature AlphaGo Zero superhuman performance  
superhuman generic human superhuman

AlphaGo Zero AlphaGo Master superhuman AlphaGo Master  
generic superhuman game

AlphaGo Zero superhuman  
AlphaGo Zero

game  
superhuman

Technological Singularity

Deepmind  
[4]

AlphaGo Master AlphaGo Master AlphaGo Master  
AlphaGo Zero AlphaGo Master AlphaGo Master

AlphaGo Zero AlphaGo Master AlphaGo Zero [5]  
AlphaGo Master 16 AlphaGo Zero 18  
AlphaGo Zero 14 16 45

1 Nature Magazine AlphaGo Deepmind AlphaGo Zero  
AlphaGo Master

2) AlphaGo Zero local trap  
AlphaGo Zero superhuman

AlphaGo Zero AlphaGo Master AlphaGo Master  
AlphaGo Master AlphaGo Master [6] Nature  
AlphaGo Zero AlphaGo Master deep-learning  
AlphaGo Master

AlphaGo Zero [7] superhuman AlphaGo Zero

AlphaGo generic human Deepmind AlphaGo AlphaGo AlphaGo

AlphaGo AlphaGo [8]

Turing Machine AlphaGo AlphaGo Zero AlphaGo Master AlphaGo Zero AlphaGo Zero

[9]

Turing Machine Universal approximation

Socratic method

Karl Popper [10]

Neurosciences human specific intelligence

Alan Turing Geoffrey Hinton Demis Hassabis AlphaGo

Demis Hassabis deep-learning reinforcement AlphaGo Zero generic superhuman Geoffrey Hinton

Turing Machine Turing Machine Geoffrey Hinton Turing Machine Alan Turing



「Turing Test」は、人工知能の能力を評価するためのテストである。これは、人間と機械の対話を観察し、人間の回答と機械の回答を区別するかどうかを判断するものである。

AI: A Modern Approach は、人工知能の現代的手法を解説する書籍である。この書籍は、driverless Car (自動運転車) の SAE level 5 (最高レベル) までの human specific intelligence (人間特有の知能) を実現するための技術的なアプローチを詳しく説明している。

Neurosciences (神経科学) は、人間の脳と認知の仕組みを理解するための学問である。この分野の研究は、human specific intelligence (人間特有の知能) の本質を解明し、それを人工知能に再現するための重要な手がかりを提供している。Technological Singularity (技術的特異点) [14]

これは、人工知能が人間の知能を超越し、さらなる自己進化を遂げる可能性があるという仮説である。

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「a precise set of laws governing the rational part of the mind」

[2] BRAIN Initiative 「mental diseases」 anxiety disorders like depression and post-traumatic stress disorder「obesity and eating disorders」bipolar disorder「and mental retardation」 disorders diseases

BRAIN Initiative personalities mental diseases Big Data

Down's syndrome BRAIN Initiative

[3] Leucotomy in England and Wales, 1942-1954 9284 41 28 25 2 4

personality intelligence 25 personality intelligence clinical condition 41 28 clinical condition personality intelligence

leucotomy

Renato M.E. Sabbatini Even lobotomy's preponents admitted that only one third of the operated patients would improve, while one-third remained the same, and one-third got worst Leucotomy in England and Wales, 1942-1954 <http://www.cerebromente.org.br/n02/historia/lobotomy.htm>

one third would improve one-third remained the same clinical condition personality intelligence

personality intelligence leucotomy BRAIN Initiative

[4] Cracking Go Deep Blue AlphaGo AlphaGo

[5] <http://www.alphago-games.com/> AlphaGo Zero AlphaGo Zero <https://www.101weiqi.com/chessbook/player/38348/>

[6] AlphaGo Master AlphaGo Master

[7] <http://www.alphago-games.com/> Full Strength of AlphaGo Zero, i.e. Final

Form 40 Blocks 20 Blocks Not Full Strength of Alphago Zero  
Alphago Zero

[8] Human level artificial intelligence

Alphago Zero

Alphago Zero Google Alphago Zero Alphago Human level artificial intelligence Alphago

Alphago Zero

[9] 2012 2015

“Go gaming is strictly defined within a very small space. Industrial automations are typically designed in well controlled environments, but not strictly defined. Car driving is regulated, but the environment is not well controlled”

Alphago Zero

Alphago Zero

[10] Socratic Method

[11] Dialogue Concerning the Two Chief Word Systems Socratic Method

Alphago Zero

Alphago Zero

Alphago Zero



